

# LF263-15 Evolution

23/24

**Department**

Life Sciences

**Level**

Undergraduate Level 2

**Module leader**

Robin Allaby

**Credit value**

15

**Module duration**

5 weeks

**Assessment**

Multiple

**Study location**

University of Warwick main campus, Coventry

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## Description

### Introductory description

Evolution and genetics are the two great unifying themes in biology. At one level evolution can be defined as the changes in gene frequencies in populations with time. An understanding of population genetics and evolutionary genetics is necessary to understand fundamental processes of evolutionary change, and importantly, is necessary to understand the genetic make-up of existing populations observed and studied in real time. This theoretical background is also necessary to understand the use of DNA sequence data and related information in deducing evolutionary relationships.

[Module web page](#)

### Module aims

An understanding of population genetics and evolutionary genetics is necessary to understand fundamental processes of evolutionary change and is necessary to understand the genetic make-up of existing populations observed and studied in real-time. This is natural core material for Biological Science students.

- i) The enduring influence Darwinian thought has on modern evolutionary theory.
- (ii) The 'Modern Synthesis' of Darwinism and genetics.
- (iii) Mechanistic aspects of fundamental evolutionary and population genetic processes at a simple

level.

(iv) The definition of, and distinction between, the different kinds of genetic polymorphism observed in populations, and how polymorphism is maintained.

(v) The consequences of molecular evolutionary theory, including the molecular clock concept, and the use of molecular evolutionary theory for phenetic comparisons and cladistic deductions.

(vi) Different mechanisms of speciation.

(vii) How macro-evolution can be studied through comparative developmental biology and paleontology.

(viii) How evolution is studied at the genome level in the wake of new technologies.

## **Outline syllabus**

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Historical and scientific background of evolutionary theory.

Introduction to 'modern synthesis' or Neo-Darwinism

Variation within species.

Polymorphism - transient and stable.

Molecular evolution.

Taxonomy and cladistics.

Speciation

Adaptation and selection at work

## **Learning outcomes**

By the end of the module, students should be able to:

- Level 5 understanding of the quantitative aspects of fundamental evolutionary and popular genetic processes at a simple level
- Level 5 ability to critically analyse the 'modern synthesis' of Darwinism and genetics
- Level 5 understanding of the definition of, and the distinction between, the different kinds of genetic polymorphism observed in populations
- Level 5 understanding of how polymorphism is maintained
- Level 5 ability to critically analyse the consequences of molecular evolutionary theory
- Level 5 understanding of molecular clocks

## **Indicative reading list**

Freeman and Herron, Evolutionary Analysis 2007

Students are directed to the current literature for an up-to-date appreciation of developments in this area

## **Subject specific skills**

Critically analyse the 'modern synthesis' of Darwinism and genetics.

Understand quantitative aspects of fundamental evolutionary and popular genetic processes at a

simple level.

Understand the definition of, and the distinction between, the different kinds of genetic polymorphism observed in populations.

Understand how polymorphism is maintained.

Critically analyse the consequences of molecular evolutionary theory including the concept of the molecular clock.

## **Transferable skills**

1. Quantitative skills
  2. Self directed learning
  3. Adult learning
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## **Study**

### **Study time**

<b>Type</b>	<b>Required</b>
Lectures	15 sessions of 1 hour (10%)
Other activity	10 hours (7%)
Private study	125 hours (83%)
Total	150 hours

### **Private study description**

Self directed learning and revision for the end of year exam

### **Other activity description**

Authentic assessment, based on a common problem or dataset researchers would deal with on a regular basis in the academic environment. This is in-line with both AQSC and RSB requirements on assessments

### **Costs**

No further costs have been identified for this module.

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## **Assessment**

You do not need to pass all assessment components to pass the module.

Students can register for this module without taking any assessment.

## Assessment group D

	<b>Weighting</b>	<b>Study time</b>
In-module assessment	30%	30 hours
Authentic assessment, based on a common problem or dataset researchers would deal with on a regular basis in the academic environment. This is in-line with both AQSC and RSB requirements on assessments		
Online Examination	70%	
45 min short answer paper / 45 min essay paper		

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- Online examination: No Answerbook required

## Assessment group R

	<b>Weighting</b>	<b>Study time</b>
In-person Examination - Resit	100%	
45 min SAQ paper / 45 min essay paper		

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- Answerbook Green (8 page)
- Students may use a calculator

## Feedback on assessment

Final examination feedback is given to returning students as generalised feedback on what constituted a good essay; common mistakes/misconceptions and good practise are identified and shared.

[Past exam papers for LF263](#)

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## Availability

### Courses

This module is Core for:

- UBSA-3 Undergraduate Biological Sciences
  - Year 2 of C100 Biological Sciences

- Year 2 of C100 Biological Sciences
- Year 2 of ULFA-C1A1 Undergraduate Biological Sciences (MBio)
- Year 2 of ULFA-C113 Undergraduate Biological Sciences (with Placement Year)
- Year 2 of ULFA-C1A5 Undergraduate Biological Sciences with Industrial Placement (MBio)

This module is Core optional for:

- UIPA-C1L8 Undergraduate Life Sciences and Global Sustainable Development
  - Year 2 of C1L8 Life Sciences and Global Sustainable Development
  - Year 2 of C1LB Life Sciences and Global Sustainable Development: Ecology

This module is Optional for:

- Year 2 of UBSA-C700 Undergraduate Biochemistry
- ULFA-C1A2 Undergraduate Biochemistry (MBio)
  - Year 2 of C1A2 Biochemistry
  - Year 2 of C700 Biochemistry
- Year 2 of ULFA-C702 Undergraduate Biochemistry (with Placement Year)
- Year 2 of ULFA-C1A6 Undergraduate Biochemistry with Industrial Placement (MBio)
- UBSA-C1B9 Undergraduate Biomedical Science
  - Year 2 of C1B9 Biomedical Science
  - Year 2 of C1B9 Biomedical Science
  - Year 2 of C1B9 Biomedical Science
- ULFA-C1A3 Undergraduate Biomedical Science (MBio)
  - Year 2 of C1A3 Biomedical Science
  - Year 2 of C1B9 Biomedical Science
- Year 2 of ULFA-C1A7 Undergraduate Biomedical Science with Industrial Placement (MBio)
- ULFA-CB18 Undergraduate Biomedical Science with Placement Year
  - Year 2 of CB18 Biomedical Science with Placement Year
  - Year 2 of CB18 Biomedical Science with Placement Year
  - Year 2 of CB18 Biomedical Science with Placement Year
- Year 2 of ULFA-B140 Undergraduate Neuroscience (BSc)
- Year 2 of ULFA-B142 Undergraduate Neuroscience (MBio)
- Year 2 of ULFA-B143 Undergraduate Neuroscience (with Industrial Placement) (MBio)
- Year 2 of ULFA-B141 Undergraduate Neuroscience (with Placement Year) (BSc)